REMARKS

The claims in this application are claims 12-15.

Claims 14 and 15 have been rejected under the second paragraph of 35 USC § 112 as being indefinite. This rejection is respectfully traversed.

The rejection is based on the recitation "plasticizing amount." It is not clear whether the examiner believes that one of ordinary skill would not know the meaning of that recitation or whether the examiner believes that because it is a functional limitation it is inherently indefinite.

If the examiner is of the opinion that functional limitations are *per se* indefinite, he is referred to MPEP § 2173.05(g) and the decisions cited therein.

If it is the recitation itself that causes the examiner problems, it should be understood by one of ordinary skill in the art that a "plasticizing amount" is an amount which plasticizes or an amount that causes plasticization. The terms themselves are extremely well known to those of ordinary skill in the relevant art and as merely exemplary, a page of *Polymer Technology Dictionary*, Tony Whelan, pp. 308-309, 1994, is attached hereto. See, in particular, the definitions for "plasticization," "plasticized compound" and "plasticizer."

Claims 12-15 have been rejected under 35 USC § 102(b) as being anticipated by Sakurai et al., JP 07-713342 ('342), 07-011074 ('074) or 06-306252 ('252). This rejection is respectfully traversed.

To be an anticipation under 35 USC § 102, a reference must disclose each and

every element of the rejected claim. See MPEP § 2131 and the cases cited therein.

The instant claims are drawn to very specific mixtures of esters of cyclohexane-1,2-dicarboxylic acid. They are defined in the claims as hydrogenation products of phthalic acid esters defined by CAS numbers. The CAS numbers represent well defined products prepared from alcohol mixtures of branched alcohols with a given number of carbon atoms. In other words, each CAS number defines a specific mixed ester. The hydrogenation products recited in the claims are thus each a well defined mixed ester of 1,2-cyclohexane dicarboxylic acid.

Even in the absence of the above stated facts, the references would not properly support a rejection under 35 USC § 102.

'342 only broadly discloses C_6-C_{28}-alkyl or alkenyl esters of cyclohexene or cyclohexene dicarboxylic acids broadly. '074 discloses essentially the same broad class of esters. '252 is even broader because, in addition to the subject matter of the other two references, there is broadly disclosed C_6-C_{28}-alkyl or alkenyl esters of benzoic acid and C_5-C_{35}-alkyl or alkenoic acids. No single ester is identified in the abstracts supplied by the examiner. In a Chemical Abstracts page supplied by the examiner, but not referred to by name, '342 is disclosed, and diisononylhexahydrophthalate and didecylhexahydrophthalate are specifically disclosed, but those esters are not among the ones recited in claims 12 or 13. It has been well established that a broad reference which includes numerous species does not necessarily, *ipso facto*, "disclose, each and every one of those species." *In re*

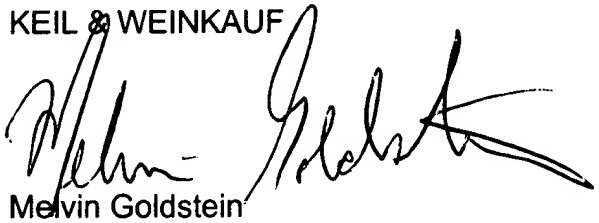
Baird, 16 F.3d 380, 29 USPQ2d 1550 (Fed. Cir. 1994). *In re Luvisi*, 242 F.2d 102, 107 (note 2 144 USPQ 646, 650) (note 2 CCPA 1965). Since the instant claims refer to specific mixtures of individual compounds within the generic disclosure of the references, and not the compounds *per se*, it is even more clear that in the instant case there is no basis for a correct holding of anticipation.

In light of the foregoing comments, it is believed that the rejections of record have been obviated and allowance of this application is respectfully requested.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

KEIL & WEINKAUF



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plastic foam
See *cellular plastic* (the preferred terminology).

plastic material
Usually means a *plastics material.*

plastic nets
See *extruded net.*

plastic pipe
A hollow cylinder made of a plastics material in which the wall thicknesses are usually small when compared to the diameter and in which the inside and outside walls are essentially concentric.

plastic sulphur
See *polymeric sulphur.*

plastic tubing
A particular size of *plastic pipe* in which the outside diameter is essentially the same as the corresponding size of copper tubing or, small diameter flexible pipe.

plastic yield
Also called non-elastic deformation. The deformation which remains when the deforming force is removed.

plastication
Also called plastification. The process of plasticizing a material i.e. turning a plastic material into a melt. See *heat softening.*

plasticised polyvinyl chloride
See *plasticized polyvinyl chloride.*

plasticiser
See *plasticizer.*

plasticity
The susceptibility of a rubber compound to deformation and the retention of that deformation. The ability of a material to be shaped by the application of a stress and to retain that shape when the stress is removed. In rubber technology, the term is used as a measure of the viscosity of unvulcanized rubber or of unvulcanized rubber compounds. The degree of flow which occurs under given conditions of temperature and pressure. Plasticity measurements are made in a *plastimeter* which gives the *plasticity number* of a rubbery material.

plasticity number
The *plasticity number* of a rubbery material is a test result obtained from a *plastimeter.* See *plasticity retention index.*

plasticity retention index
An abbreviation used for this term is PRI. Measured by the ratio of P_{30}/P_0 where P_0 is the initial *Wallace plasticity* and P_{30} is the Wallace plasticity after ageing for 30 m at 140°C. Usually expressed as a percentage and is a measure of, for example, the resistance of raw *natural rubber to oxidation.*

plasticization
An increase in softness and flexibility. Could be brought about by the use of a *plasticizer* but, sometimes the term means that the softening occurred as a result of heating, that is, thermal plasticization. See *heat softening.*

plasticized
In extrusion technology means that a plastics material has been turned into a melt; in *polyvinyl chloride* (PVC) technology can also mean that the resin has been made softer by the incorporation of a plasticizer.

plasticized compound
A compound which has been made relatively soft by the incorporation of a *plasticizer.*

plasticized polyvinyl chloride
Also known as plasticised polyvinyl chloride or, polyvinyl chloride-plasticized or, plasticized polychloroethene. An abbreviation used for this material is PPVC or PVC-P. A *polyvinyl chloride* (PVC) compound which contains a *plasticizer.*

Plasticizers are used in PVC compounds in order to confer flexibility, softness and ease of processing. The plasticizers most commonly employed are high boiling point esters of C_{8-10} alcohols: such as phthalates, phosphates and sebacates. Examples of common plasticizers are *dioctyl phthalate (DOP), di-iso-octyl phthalates (DIOP)* and *dialphanyl phthalate (DAP).*

The discovery that plasticized PVC could be converted to an elastomeric-type material, by the addition of low molecular weight plasticizers, was made many years ago (by Dr Waldo Semon in the 1920s) when attempts were made to dissolve the polymer. Polymeric plasticizers were used approximately 10 years later and the use of rubbers, as property modifiers, was introduced shortly afterwards.

As there are many different plasticizers, which may be used in different amounts and/or in combination, then a wide range of plasticized compounds is possible. Such compounds will differ not only in flexibility and softness, but will also differ in other respects, for example, tensile strength, resilience and ease of flow. These latter properties can also be affected by the combination of different plasticizers and of different molecular weight resins.

The term 'plasticized' (also spelt 'plasticised') simply means that there is plasticizer (plasticiser) present in the compound as well as other additives - see *unplasticized polyvinyl chloride* (UPVC). PPVC is a much easier flowing material than UPVC. To realize the potential of this material it is necessary to put in just sufficient work and heat so that the blend is fully gelled, or fused, but not so much that it is degraded.

In general, the chemical resistance of PPVC is good, for example, it is resistant to water and salt solutions; dilute acids and alkalis have little effect at room temperature but, at elevated temperatures, some hydrolysis and extraction of the plasticizer may occur. Concentrated acids and alkalis hydrolyse plasticizers slowly when cold but more rapidly when heated. Most organic liquids will extract plasticizers and cause compound hardening.

As the natural colour of the plasticized material can be clear a wide colour range is possible - both transparent and opaque. With PPVC, only pigments should be used because of colour bleeding, or leaching problems, with dyestuffs.

PPVC sheet is produced with an excellent surface finish and/or with remarkable transparency, by for example, *calendering*: such sheet can be rapidly, and strongly, welded into large and complex shapes by the technique known as high, or radio, frequency welding. Typical injection moulded components include washers, grommets, electrical cable ends, footwear, heel tags, watch straps, electrical shields, plugs, automobile arm rests, knobs, metal reinforced steering wheels and components associated with the medical industry.

plasticizer
A material added to a polymer system in order to improve processing behaviour and/or to improve compound flexibility.

Camphor is best known in the plastics industry as a plasticizer for cellulose nitrate and was first used as such by John and Isaiah Hyatt in approximately 1868. Now, it is *polyvinyl chloride* (PVC) which is associated with plasticizer use although, due to the growing use of *unplasticized polyvinyl chloride* (UPVC), the relative importance of *plasticized polyvinyl chloride* (PPVC) has decreased in recent years. However, it is probable that approximately 80% of all materials produced as plasticizers are still used with PVC. A plasticizer is usually an organic non-volatile liquid with a high boiling point: such materials usually have a relatively high molecular weight (approximately 300). Esters are widely used as such materials are relatively easy to produce and are compatible with the polar PVC.

Plasticizers were first added to plastics materials in order to allow the plastics material to be processed at temperatures below the decomposition temperature of the polymer. Now, *processing aids* are used to ease processing. Most commercial plasticizers are based on *phthalates* and include *dioctyl phthalate (DOP)* and *di-iso-octyl phthalate (DIOP)*. By adding such materials to PVC, plasticized PVC (PPVC) is produced: in general, this material flows much more easily than the unplasticized material (UPVC) and is softer and more flexible. Initially the addition of small amounts of plasticizer may result in a more brittle material (see *critical concentration*) but further additions of plasticizer will produce a progressively softer material.

Plasticizers may be grouped in various ways, for example, into *adipates*, *azelates*, *chlorinated hydrocarbons*, *phosphates*, *phthalates* and *sebacates*. May also be classed as *primary plasticizers*, secondary plasticizers and as plasticizer extenders. See *general purpose plasticizer*.

plasticizer alcohol
An alcohol used to make a *plasticizer*, for example, a *phthalic acid ester*. Such an alcohol usually contains from 6 to 11 carbon atoms and these relatively cheap materials are commonly esterified with *phthalic anhydride* to make plasticizers.

plasticizer - comparison
Plasticizers are usually compared against a well known plasticizer such as *dioctyl phthalate (DOP)*. A particular property is chosen (modulus or hardness) and then the new plasticizer and DOP are used to make separate compounds which, for example, have the same value. For example, to give a modulus of 1,500 lbf/in^{-2} at 100% elongation (see *efficiency proportion*). The ratio of the plasticizer concentrations (test material to DOP) may be designated the plasticizer efficiency.

Hardness is often compared on the basis of using 50 parts per hundred of resin (phr). The test plasticizer is turned into a compound at this concentration and DOP is turned into another compound. All other ingredients are kept the same and the two compounds are then compared. Such DOP compounds typically have Shore hardnesses (A scale) of 80.

Other relevant properties are determined by appropriate tests. These may include gelation rate, plasticizer loss by volatilization (oven heating), loss by extraction (water, oil, hexane and iso-octane), loss by migration into other materials and low temperature flexibility tests.

plasticizer efficiency
See *plasticizer - comparison*.

plasticizer extender
See *extender*.

plasticizing unit
A unit of a machine (for example, an *injection moulding machine*) which produces a polymer *melt*.

plastics calender
A *calender* used for plastics materials, usually *polyvinyl chloride* (PVC) compounds.

plastics copolymer
See *copolymeral* and *abbreviations*.

plastics masterbatch
See *masterbatch*.

plastics material
A material that contains as an essential ingredient one or more high molecular weight polymers which is solid at room temperature and which, at some stage, is capable of being shaped by flow.

All plastics are polymers but not all polymers are plastics. For example, cellulose is a *polymer* but it cannot be processed like a plastics material unless it is modified. A plastics material is therefore a polymer, which is capable of being shaped or moulded under, for example, conditions of moderate temperature and pressure: distinguished from a rubber/elastomer, by having a higher stiffness/modulus and a lack of reversible elasticity. There are two main categories of plastic and these are *thermoplastics* and *thermosetting plastics (thermosets)*. In terms of tonnage thermoplastics are by far and away the most important. Some desirable properties of plastics (which are not possessed by any one polymer) include physical strength, resilience, corrosion resistance, elasticity, electrical insulation, wide colour range, thermal insulation, lightness in weight, chemical resistance and mouldability. Plastics materials are therefore versatile and their use, for example, may simplify production due to the ease with which several discrete components may be incorporated into one component by, for example, *injection moulding*. Neither the materials, the moulds, nor the machines are cheap but the products of the plastics industry are available at an economic price due to such processes.

Plastics materials are therefore widely used because they can be turned into complex components, or shapes, relatively easily at an economic price: they also have a useful combination of properties which can be amended or altered within wide limits.

Many new markets are created for plastics materials by replacing metal components with thermoplastics mouldings. This is because of the ease with which complex components may be produced from polymer compositions by processes such as *injection moulding*. Compared to metals, such materials lack strength, stiffness, temperature resistance, fire and flame resistance; not only do plastics material burn relatively easily but they evolve large quantities of smoke and fumes when they do burn. Many plastics components, such as mouldings, will creep or change their dimensions if subjected to relatively small loads for prolonged periods of time. Environmental stress cracking (ESC), changes of dimensions with humidity and sudden change from tough to brittle behaviour are other factors which should be investigated before, for example, materials such as thermoplastics are used.

plastics melt processes
See *thermoplastics melt processes*.

plastics paste
Plastics material in a *paste* form can be used to coat a substrate (for example, a metal) and/or to make mouldings. See *plastisol*.

plastics powder
A plastics material in a powder form or, a plastics compound in a powder form. A plastics compound in *powder* form can be used to coat a substrate (e.g. a metal) and/or to make mouldings (see *powder moulding*). However because of heat generation, the reduction of the compound to a powder can be difficult.

Plastics Bottle Institution
An abbreviation used for this USA-based organization is PBI: the PBI issues codes as an aid to sorting before recycling. See *container identification*.

Plastics Recycling Development
An English translation of *Entwicklungsgesellschaft für die Wiederverwertung von Kunstoffen*. An abbreviation used for this German-based organization is EWvK.

Plastics and Rubber Institute
See *Institute of Materials*.

plastification
See *plastication*.

Plastificator shear-cone compounder
See *shear-cone compounder*.